Introduction to Wage Statistics in Japan

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I. Introduction

The gender pay gap in Japan narrowed with the average wage of women reaching 70% of that of men, the *Nihon Keizai Shimbun* reported in February 2012.[1] We often see these kinds of news reports on wage trends, and when you open a labor economics textbook you will probably see a chart of long-term wage trends. There are approximately 55 million wage workers in Japan. How is their average wage calculated? Some people may think that the government, which collects taxes and therefore should know how much individual workers earn, calculates the average wage based on such income amounts. It may be surprising, but a database that would enable such calculations is not available in Japan, where a taxpayer identification number system is not yet in place. As such, average wages and other pertinent figures are calculated based on statistical survey data.

In this article, I would like to introduce some major statistical surveys conducted by the Japanese Government on wages. Since these surveys are all based on randomly-selected probability samples, average wages calculated from their collected data do not represent the average wage of the entire population of wage workers in Japan. Therefore, the average wage and wage distribution of a sample are subject to deviations from those of the entire population of wage workers, depending on which individuals are selected into the sample. In statistics terminology, such deviations are called "sampling error." In the case of the government statistics on wages to be introduced in this article, the problem of sampling error is not so serious, because samples used in the surveys include a large number of workers. What is more important is to understand the process in which statistical data is collected, and because of that process, what types of wage workers may be excluded from the samples to cause deviations. We call this type of deviations "non-sampling error."

In statistical surveys, information is collected by means of questionnaires, which are typically delivered by hand or downloaded in the Excel file format by individual respondents, who would complete the questionnaires by filling in their answers or entering selected item numbers. Thus, in order to clearly understand exactly what is being surveyed, it is also important to look at how the questions in the questionnaire are worded. By imagining how and in what process raw data are collected and processed into final data, you can have a better idea of the implications of statistical figures you handle. Those who have just started studying labor economics often fail to pay attention to basic questions concerning statistical

[1] "Danjo no Chingin Kakusa Saisho—Sakunen no Josei Heikin, Dansei no 7 wari ni [Gender pay gap shrinks to record low with average wage for women reaching 70% of that of men last year]," *Nihon Keizai Shimbun*, February 12, 2012.

figures, i.e., what kind of survey they are derived from and how they are calculated. It is important to start by looking at the very basics.

Before explaining specific government statistics, I would like to touch on the question of the time frame in which to measure wages, i.e., an amount paid to employees in return for their work. In Japan, full-time permanent direct employees usually receive salaries fixed on a monthly basis, whereas others such as part-timers and casual workers are typically paid on an hourly basis. Because of the presence of the two different time units, it is necessary to adopt a uniform time frame in measuring wages. In many cases, wages are measured on an hourly basis. Hourly wages are also referred to as hourly wage rates. The hourly wage for an employee paid on a monthly basis can be calculated by dividing the monthly salary by the number of hours worked per month. The use of such hourly wages enables a comparison of wages between full-time permanent direct employees and others, and solves problems that may arise from the fact that working hours differ even among full-time permanent direct employees. However, in order to calculate hourly wages, statistics need to include data on the number of hours worked per month or per year, along with those on monthly or annual wages.

It is also necessary to take bonuses into account when considering wages for full-time permanent direct employees. On average, Japanese full-time permanent direct employees receive bonuses equal to 2.7 months' salary per year. Suppose someone receives bonuses equal to three months' salary per year. This means that 20% of his or her annual income comes from bonuses. Ignoring the amount received in bonuses would significantly underestimate his or her wage level. Given the fact that the ratio of bonuses to yearly earnings tends to be higher for men than for women, ignoring bonuses would also result in the underestimation of the gender pay gap. Likewise, the wage gap by age would be underestimated as well because the bonus ratio is higher for middle-aged and senior employees than for young employees. Furthermore, a closer look at the recent declines in nominal wages, which surfaced as a serious problem in the 2000s, reveals that while monthly salary levels have remained almost unchanged, bonus levels have dropped by about 15%. This also points to the importance of including bonuses in the calculation of hourly wages in understanding the actual status of wages.

II. Basic Survey on Wage Structure

If you want to do research on wages, the Ministry of Health, Labour and Welfare (MHLW)'s Basic Survey on Wage Structure is the first thing you should look at. The purpose of this survey is to find out the actual status of wages of workers employed in major industries by type of employment, engagement (full-time or part-time), occupation, as well as gender, age, educational background, years of service, experience, and so forth. The survey asks business establishments to provide information as of June on the number of hours worked, and the amount of wages paid on an individual employee level. The survey popula-

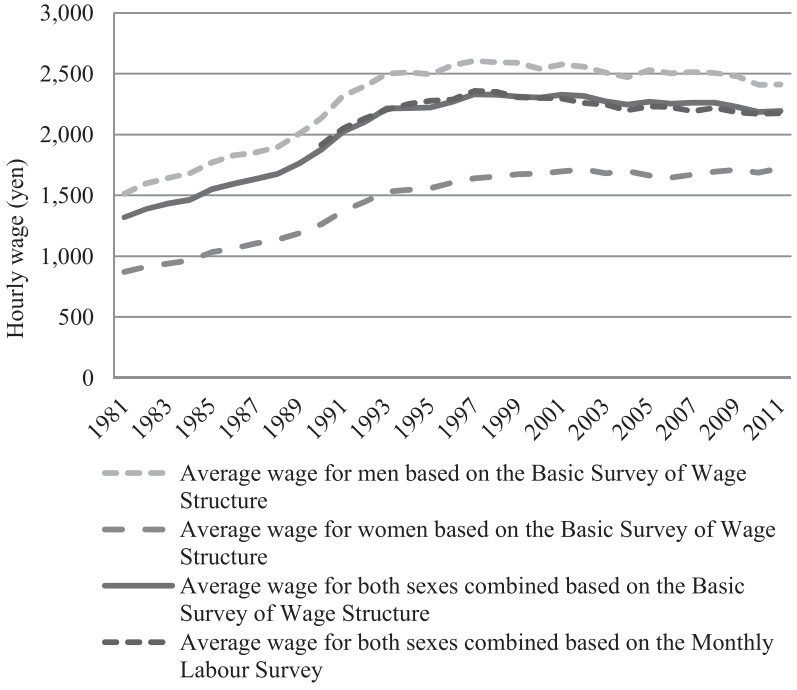
tion comprises a total of some 1.29 million business establishments with five or more "regular employees" (defined as those falling under any of the following: (i) permanent employees, (ii) employees contracted for a period exceeding one month, (iii) employees contracted on a daily basis, or for one month or less who were employed for 18 days or more in both April and May of the survey year) in 16 major industries, covering a total of about 36.53 million employees, from which about 77,000 business establishments with a total of about 1.57 million employees are probabilistically sampled. It should be kept in mind that employees working at business establishments with four employees or fewer and those working in the public sector are outside the sampling frame of the survey. In drawing a probabilistic sample, the targeted population is stratified into multiple groups based on the location (prefecture), type of industry, and size of respective business establishments. Then, a designated number of business establishments are chosen from each group. The questionnaire is distributed to the selected business establishments, each of which would then be asked to probabilistically select a sample of employees from those listed on the directory of employees or payroll register. The business establishments are asked to provide the following information for each of their sampled employees: type of employment defined by whether the individual is regarded as *seishain* (i.e., a member of the regular staff) within the organization and whether the employment is permanent or for a fixed period; type of engagement defined by the length of his or her regular working hours; educational background (except for temporary workers and part-timers); age; number of years of tenure; type of workers classified by production workers or not; class of position (applicable only when the responding business establishment belongs to a company with 100 employees or more); type of occupation; number of days worked; number of scheduled hours worked; number of overtime hours worked; amount of cash wages paid regularly; and amount of extra compensation such as semi-annual and end-of-year bonuses. Of these, the amount of cash wages paid regularly is the amount of salary per month, and includes the amounts of overtime pay, commuting allowance, attendance bonuses, and family allowance as its components.

Readers are advised to refer to the MHLW website for further details of the statistics. For those who want to download data for processing in Excel or other applications, an online search system for labor statistical data developed by the Japan Institute for Labour Policy and Training (JILPT) would be quite useful. Using data downloaded from the JILPT site, I calculated the average hourly wages for men and women by the formula below and plotted the results in Figure 1.

Hourly wage = (Amount of cash wages paid regularly + Annual amount of extra compensation in the previous year/12) / (Number of scheduled hours worked + Number of overtime hours worked)

In the above calculation, 1/12 of the amount of extra compensation such as bonuses is regarded as extra compensation applicable to work performed in June, the surveyed month.

From this, we can see that the average hourly wage in June 2011 was 2,412 yen for



Sources: Calculated by the author using data from the *Basic Survey on Wage Structure* and those from the *Monthly Labour Survey*.

Note: The amount of hourly wage, as defined in the Basic Survey on Wage Structure, is calculated as: *(Amount of cash wages paid regularly + Annual amount of extra compensation/12) / (Number of scheduled hours worked + Number of overtime hours worked)*. In contrast, the Monthly Labor Survey calculates the hourly wage as: *Total cash wages paid (including bonuses) / Total hours worked*.

Figure 1. Hourly Wage Trends for Men, Women, and Both Sexes Combined

men and 1,724 yen for women. The average hourly wage for men peaked at 2,605 yen in 1997 and has since generally followed a downward trend, reflecting the severe state of the Japanese economy.

Being based on a large sample, the Basic Survey on Wage Structure allows for a fairly accurate estimation of average values by age group, industry, and size of company, which is a major advantage of the survey. Because of the large size of the sample, the Basic Survey on Wage Structure is often called “Wage Census” in Japan. However, this is misleading and the use of such terms should be avoided because the English term “census” refers to a survey that collects data on the entire population, whereas the Basic Survey on Wage Structure is a sample survey and obtains information only from a subset of the population.

III. Monthly Labour Survey

The Basic Survey on Wage Structure inquires about the situation in January, and the results of the survey are published in or around February the following year. As such, the use of a large sample necessitates a compromise in timeliness. Thus, when we want to identify short-term economic trends, we often turn to the MHLW's Monthly Labour Survey, which can be defined as a simplified version of the Basis Survey on Wage Structure. The Monthly Labour Survey is also targeted at business establishments with five or more regular employees in the 16 major industries, but only about 33,000 establishments are selected as a sample in a probabilistic manner. That is, the size of the sample is less than half of that for the Basic Survey on Wage Structure. However, the Monthly Labour Survey is conducted monthly and the preliminary survey results are made available the following month. The biggest difference between the two surveys is that the Monthly Labour Survey asks about the overall situation of each business establishment and not the situation of each sampled individual, thereby reducing the burden on the part of responding business establishments. The questionnaire asks business establishments to provide the following information on the employees as a whole: number of regular employees in total and by gender, total number days worked, total number hours worked, and the total amount of cash wages paid. In other words, the Monthly Labour Survey asks respondents to provide information aggregated at the establishment level for both working time and wages. The number of hours worked is the total of the number of scheduled hours worked and the number of overtime hours worked, and the breakdown figures are provided as well. The amount of cash wages paid is the total of the amount of cash wages paid regularly and the amount of special pay (including bonuses), plus the breakdown figures.

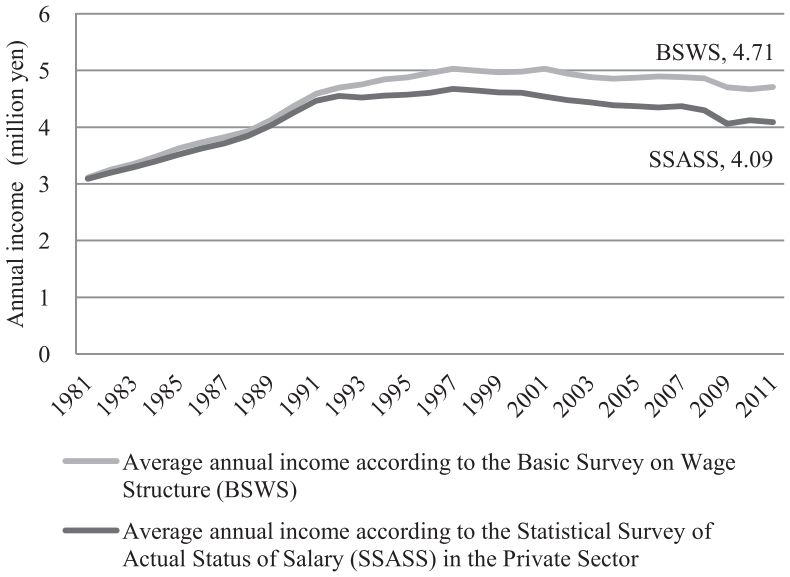
When we search for the Monthly Labour Survey using the JILPT's online system for labor statistical data, we can obtain not only monthly data but also data for calendar years. Plotted in Figure 1 as representing the average hourly wage based on Monthly Labour Survey are the values calculated for both sexes combined using data obtained through this system. The average hourly wage peaked in 1997 and has since declined as is the case for that based on the Basic Survey on Wage Structure. The amount of hourly wage in 2011 is calculated to be 2,176 yen. While data provided by the Monthly Labour Survey are full-year data, those collected in the Basic Survey on Wage Structure basically represent the situation in June. Therefore, it is no wonder that the amount calculated based on one survey is not identical to that based on the other. Rather, the very fact that the average hourly wages calculated based on data from the two separate surveys have been both stabilized around 2,180 yen, demonstrates that these surveys have only a small sampling error. In the case of the Monthly Labour Survey, the MHLW also releases indices adjusted for the effect of changes in sample composition and recommends their use in making comparisons over time.

IV. Statistical Survey of Actual Status of Salary in the Private Sector

Next, let's take a look at the Statistical Survey of Actual Status of Salary in the Private Sector conducted by the National Tax Agency (NTA). The purpose of this survey is to find out the actual status of private-sector salaries in each year by wage level, size of business establishment, size of company, and so forth, thereby preparing data to serve as a basis for the estimation of tax revenue, examination of the tax burden, implementation of tax administration, and so forth. The target population of the survey is wage earners working in private-sector business establishments. The scope of the target population, which includes the top managers of companies, is greater than that of the Basic Survey on Wage Structure, which is targeted at those falling under the definition of "workers" under the Labor Standards Act. The NTA's survey is also targeted at a broader spectrum of business establishments, including all those having at least one wage earner, whereas only those with five or more regular employees are targeted in the Basic Survey on Wage Structure. Business establishments are classified into 14 industry categories in the Statistical Survey of Actual Status of Salary in the Private Sector, compared to 16 in the Basic Survey on Wage Structure. This is because those falling into the single category of "services" in the former are classified into three separate categories—i.e., "accommodations, eating and drinking services," "living-related and personal services and amusement services," and "services, not elsewhere classified"—in the latter. Meanwhile, agriculture, forestry, and aquaculture, which are outside the scope of the Basic Survey on Wage Structure, are included as part of "agriculture, forestry, fisheries, and mining" in the NTA's survey.

The sampling method employed in the survey is the same as that of the Basic Survey on Wage Structure, in that the government probabilistically selects a sample of business establishments, and each of the sampled business establishments is asked to probabilistically select a sample of individuals (workers). First, all business establishments in Japan are stratified into multiple groups based on their size and other attributes, and a sample of business establishments are probabilistically selected from each group. Then, each sampled business establishment is asked to probabilistically select individuals as subjects for the survey from those listed on the payroll. Here, all workers whose annual income from employment exceeds 20 million yen are to be included in the sample. In the case of the 2011 survey, a total of 275,710 wage earners working in 20,238 business establishments were sampled, respectively 18% and 26% lower compared to approximately 1.57 million employees in approximately 77,000 business establishments sampled in the Basic Survey on Wage Structure. The number of individuals sampled in the NTA's survey is small relative to that of sampled business establishments, suggesting that its sample includes a greater proportion of small-sized business establishments than that of the Basic Survey on Wage Structure.

The NTA's survey asks respondents to provide the following information on sampled wage earners: gender, age, number of years of service, number of months for which salaries



Source: Created by the author based on data from the MHLW's *Basic Survey on Wage Structure* and the NTA's *Statistical Survey of Actual Status of Salary in the Private Sector*.

Note: For the Basic Survey on Wage Structure, the amount of annual income is calculated as: *Amount of cash wages paid regularly × 12 + Amount of extra pay*. For the Statistical Survey of Actual Status of Salary in the Private Sector, the amount of annual income is the average income for those who worked throughout the year and calculated as: *Total amount of annual salaries / Number of workers.*

Figure 2. Time-Series of Annual Income According to the Basic Survey on Wage Structure and the Statistical Survey of Actual Status of Salary in the Private Sector, in Million Yen

were paid during the surveyed year, status or function (e.g., company's top representative, directors, officers, etc.; family employee of a sole proprietor filing "blue-form" income tax returns; part-timer; other salaried employee), subject or not subject to year-end tax adjustments, status of spousal exemptions, number of dependents, personal deductions applicable to the surveyed individual, amount of private pension insurance premiums paid, amount of salaries received, miscellaneous deductions, and amount of tax on the income earned in the year. The "amount of salaries" referred to above is the total sum of "salaries, allowances, etc." and "bonuses." Since this survey does not include any question regarding working hours, we cannot calculate wages per hour. As such, while having the advantage of providing extensive information relating to taxes, the NTA's survey has its disadvantage in that it does not allow for the calculation of per-hour wages. In order to enable comparison with the Basic Survey on Wage Structure, I calculated annual income amounts separately based on data from these two surveys and plotted the results in Figure 2. While the two time-series

are similar in trend with the annual income heading downward after peaking in 1997, they gradually deviate from one another to show a gap of 620,000 yen in 2011. This deviation may be attributable to the fact that business establishments with four employees or less are included in the Statistical Survey of Actual Status of Salary in the Private Sector, but not in the Basic Survey on Wage Structure.

V. Survey of Job-by-Job Pay Rates in the Private Sector

Lastly, I would like to introduce the Survey of Job-by-Job Pay Rates in the Private Sector conducted by the National Personnel Authority (NPA). The purpose of this survey is to collect data to serve as a basis for the comparison and assessment of salary levels for national and local government servants against those for private-sector employees, in line with the relevant provisions of the National Public Service Act and the Local Public Service Act. It is targeted at private-sector employees working in business establishments with 50 or more employees belonging to a company with 50 or more employees, whereby business establishments are asked to provide the amounts of gross pay, overtime pay, commuting allowance, etc. paid to individual employees for the month of April. For the purpose of this survey, “employees” refer to full-time employees employed for an indefinite period of time (including those age 61 or above) and exclude those employed on a temporary basis. Business establishments are also asked to provide the aggregate totals of bonuses and regular pay for the month, the number of employees on the payroll, as well as information about various allowances and benefits. In the 2012 survey, a stratified probabilistic sample of 11,085 business establishments were selected from the targeted population of 50,187 business establishments which were stratified into multiple groups based on their location, type of industry, size of the company to which they belong, and so forth. The survey collected information on a total of 441,066 employees engaged in the types of jobs surveyed other than those designated for new employees. The numbers of employees and business establishments sampled in this survey are respectively 28% and 14% lower compared to approximately 1.57 million employees in approximately 77,000 business establishments sampled in the Basic Survey on Wage Structure. As such, the number of individuals sampled in the NPA’s survey is large relative to that of sampled business establishments, suggesting that its sample includes a greater proportion of large-sized business establishments than that of the Basic Survey on Wage Structure.

As indicated by its name, the Survey of Job-by-Job Pay Rates in the Private Sector aims to find out the levels of pay for private-sector employees by type of jobs, which are also highlighted in survey results released on the Internet. For the purpose of comparison, I have selected some types of jobs/occupations and calculated the average age of sampled individuals engaged in each type of job/occupation and the average amount of regular pay they receive using data from the Survey of Job-by-Job Pay Rates in the Private Sector and the Basic Survey on Wage Structure. The results are shown in Table 1. In order to control

Table 1. Comparison of Two Statistics for 2011

Type of job/occupation	Survey of Job-by-Job Pay Rates in the Private Sector		Basic Survey on Wage Structure (Business establishments belonging to companies with 1,000 employees or more)	
	Age	Amount of regular pay (yen)	Age	Amount of cash wages paid regularly (yen)
University professor	56.5	742,171	56.9	694,100
University associate professor	47.0	587,492	46.2	551,500
University lecturer	42.3	505,314	42.7	501,400
Physician	42.4	934,342	35.7	696,100
Dentist	39.4	736,198	35.2	433,900
Pharmacist	34.7	343,064	33.6	343,400
Nurse	36.6	345,233	33.7	346,500
Chauffeur	52.0	415,652	55.2	246,400
Guard	52.7	394,952	55.9	284,100
Janitor	52.4	335,997	52.5	221,600

Sources: Table 5 of the NPA's *2011 Survey of Job-by-Job Pay Rates in the Private Sector* and Table 1 for occupation-by-occupation data of the MHLW's *2011 Basic Survey on Wage Structure*.

for the difference in the targeted population (consisting of business establishments with 50 employees or more of companies with 50 employees or more in the case of the former, and business establishments with five or more in the case of the latter), the average figures for the Basic Survey on Wage Structure were calculated by limiting the scope of business establishments to those belonging to companies with 1,000 employees or more. Average amounts of regular pay differ significantly for some types of jobs, probably reflecting differences in the sampling process between the two surveys. Survey of Job-by-Job Pay Rates only includes workers with indefinite contract, but BSWS includes workers with fixed-term contracts as far as the workers satisfy the BSWS's definition of "regular workers."

VI. Other Surveys Conducted with Households as Respondents

I have introduced the four most-used governmental statistics in capturing the state of wages in Japan. All of them are conducted with business establishments as respondents. Meanwhile, as those targeted at households as respondents, I would like to cite the Labour Force Survey, a monthly survey by the Statistics Bureau of the Ministry of Internal Affairs and Communications (MIAC), and the Employment Status Survey, another MIAC survey

conducted every five years. They provide data on annual income and the number of hours worked, allowing the calculation of hourly wages. One major advantage of these surveys is that they include data on public servants and the self-employed. In order to take this advantage, data obtained from these surveys are often used in wage studies. Meanwhile, their disadvantage is that they ask respondents to provide interval category for the amount of wages received and the number of hours worked during a specified period of time. Although this is inevitable considering the need to alleviate the burden on the part of responding households, we need to use the median value for the period, etc. for the calculation of hourly wages. Due to the word limit, I cannot explain this theme in sufficient detail, but the use of these household surveys is recommendable depending on the purpose of studies.

VII. Relationship to the Wage Data on International Database

Wage and earnings data of Japan are available from several international organizations including Organisation of Economic Co-operation and Development (OECD) and International Labour Office (ILO). The OECD's Stat Extracts system reports that annual wages in 2011 are about 4.11 million yen, which is below the estimate from BSWS's 4.71 million yen. The average annual wage is defined as the average annual wages per full-time equivalent dependent employee calculated based on National Accounts across countries. The System of National Account of Japan estimates the earnings of employees using Labour Force Survey of MIAC and Monthly Labor Survey of MHLW. The ILO's LABORSTA reports earnings per month by industry based on the Monthly Labor Survey of MHLW.